

IN THE CLAIMS

1. (Previously presented) A method of making a semiconductor device including inductors comprising;
forming a semicircular columnar groove in an insulating layer on a semiconductor substrate;
depositing a conductive material layer over the insulating layer having the groove;
patterning the conductive material layer to form underlying conductive lines slantly longitudinally with a predetermined distance therebetween on said groove;
forming a cylindrical insulating layer in said groove formed with said underlying conductive lines and on the surface of said substrate, wherein an upper portion of said cylindrical insulating layer protrudes from an upper surface of said groove; and
forming upper conductive lines on said cylindrical insulating layer slantly longitudinally at an angle opposite the longitudinal slant of the underlying conductive lines with a predetermined distance between upper conductive lines to contact with said underlying conductive lines, wherein said upper conductive lines extend up and around said upper portion of said cylindrical insulating layer to form a rounded upper conductive line, the upper conductive lines having a substantially uniform thickness conformally formed on said insulator.
2. (Currently amended) A method of making a semiconductor device including inductors as claimed in Claim 1, wherein said forming said groove further comprises:
forming a nitride film on said insulating layer;
forming a photosensitive film pattern for exposing said nitride film ~~for a groove~~;
etching said nitride film by using said photosensitive film pattern as a mask to be exposed said insulating layer ~~for forming said groove~~; and
etching said exposed insulating layer.
3. (Previously presented) A method of making a semiconductor device including inductors as claimed in Claim 2, wherein said etching is performed by any one of an isotropic etching method and a mixed method of anisotropic etching and isotropic etching.
4. (Original) A method of making a semiconductor device including inductors as claimed in Claim 1, wherein said underlying conductive lines are slantly longitudinally formed along said groove to across.

5. (Previously presented) A method of making a semiconductor device including inductors as claimed in Claim 1, further comprising:

forming an insulating layer on the surface of said underlying conductive lines;
covering the surface of said substrate formed with said insulating layer with an oxidization prevention layer; and
burying material between said upper conductive lines in said groove.

6. (Original) A method of making a semiconductor device including inductors as claimed in Claim 5, wherein said buried material is a flux material, such as spin on glass.

7. (Previously presented) A method of making a semiconductor device including inductors as claimed in Claim 6, wherein said buried material is buried until said oxidization prevention layer is exposed when said flux material is etched back.

8. (Previously presented) A method of making a semiconductor device including inductors as claimed in Claim 5, which further comprises forming a contact region by etching said insulating layer and said oxidization prevention layer for connecting said underlying and upper conductive lines after the burying.

9. (Original) A method of making a semiconductor device including inductors as claimed in Claim 5, wherein said insulating layer is formed by oxidization of said underlying conductive lines.

10. (Original) A method of making a semiconductor device including inductors as claimed in Claim 5, wherein an oxide film is formed on said underlying conductive lines.

11. (Previously presented) A method of making a semiconductor device including inductors as claimed in Claim 1, wherein said forming said insulating layer comprises;

laminating an oxidizable material on the surface of said substrate to thereby be entirely buried said groove; and

forming said insulating layer on the surface of said substrate and said groove by oxidization of said oxidizable material.

12. (Previously presented) A method of making a semiconductor device including inductors as claimed 11, wherein said filling said groove with the oxidizable material further comprises:

laminating oxidizable materials on the surface of said substrate to thereby bury said groove; and

etching said oxidizable materials to fill only in said groove.

13. (Original) A method of making a semiconductor device including inductors as claimed 12, wherein said oxidizable materials is any one of polysilicon or amorphous silicon.

14. (Original) A method of making a semiconductor device including inductors as claimed in Claim 11, wherein said oxidizable material is etched by CMP process.

15. (Previously presented) A method of making a semiconductor device including inductors as claimed in Claim 11, wherein said step of etching said oxidizable materials is performed by an etch-back method.

16-24. (Cancelled)

25. (Previously presented) A method of making a semiconductor device including an inductor comprising:

forming a groove in an insulating layer on a semiconductor substrate;

forming lower conductive lines across said groove;

depositing a conductive material layer over the insulating layer having said groove;

patterning the conductive material layer to form lower conductive lines slantly longitudinally across said groove;

forming a cylindrical insulator above said lower conductive lines and aligned with the groove, wherein an upper portion of said cylindrical insulator protrudes from an upper surface of said groove;

forming upper conductive lines over said insulator to form a rounded upper conductive line; and

electrically coupling said upper conductive lines to said lower conductive lines.

26. (Previously presented) A method of making a semiconductor device as claimed in Claim 25, wherein said forming said groove further comprises:
forming a nitride film on said insulating layer;
forming a photosensitive film pattern on said nitride film;
etching said nitride film by using said photosensitive film pattern as a mask to expose the insulating layer; and
etching said exposed insulating layer.

27. (Previously presented) A method of making a semiconductor device as claimed in Claim 26, wherein said etching is performed by an isotropic etching method or a mixed method of anisotropic etching and isotropic etching.

28. (Cancelled)

29. (Previously presented) A method of making a semiconductor device as claimed in Claim 25, further comprising:
forming a second insulating layer on the surface of said lower conductive lines;
covering the surface of said substrate including said second insulating layer with an oxidization prevention layer; and
burying a buried material between said upper conductive lines in said groove.

30. (Previously presented) A method of making a semiconductor device as claimed in Claim 29, wherein said buried material is a flux material such as spin on glass.

31. (Previously presented) A method of making a semiconductor device as claimed in Claim 30, wherein said buried material is buried until said oxidization prevention layer is exposed when said flux material is etched back.

32. (Previously presented) A method of making a semiconductor device as claimed in Claim 29, further comprising forming a contact region by etching said second insulating layer and said oxidization prevention layer for connecting said upper and lower conductive lines.

33. (Previously presented) A method of making a semiconductor device as claimed in Claim 29, wherein said second insulating layer is formed by oxidizing said lower conductive lines.

34. (Previously presented) A method of making a semiconductor device as claimed in Claim 29, wherein an oxide film is formed on said lower conductive lines.

35. (Previously presented) A method of making a semiconductor device as claimed in Claim 25, wherein said forming said cylindrical insulator comprises:
filling said groove with an oxidizable material; and
oxidizing said oxidizable material.

36. (Previously presented) A method of making a semiconductor device as claimed in Claim 35, wherein said filling said groove with an oxidizable material comprises:
laminating an oxidizable material on the entire surface of said substrate; and
etching said oxidizable material.

37. (Previously presented) A method of making a semiconductor device as claimed in Claim 36, wherein said oxidizable material is polysilicon or amorphous silicon.

38. (Previously presented) A method of making a semiconductor device as claimed in Claim 36, wherein said oxidizable material is etched by a CMP process.

39. (Previously presented) A method of making a semiconductor device as claimed in Claim 36, wherein said etching of said oxidizable material is performed by an etch-back method.

40. (Previously presented) A method of making a semiconductor device as claimed in Claim 25, wherein said upper and lower conductive lines are slanted longitudinally along the groove in opposite directions.

41-49. (Cancelled)

50. (Previously presented) A method of making a semiconductor device comprising:

forming an insulating layer on a semiconductor substrate;
forming a groove in the insulating layer;
forming lower conductive lines slantly longitudinally on the groove, the lower conductive lines spaced apart from each other;
filling the groove with an oxidizable material layer overlying the lower conductive lines, growing the oxidizable material layer by oxidation to form a cylindrical insulating layer in the groove such that an upper portion of the cylindrical insulator protrudes from an upper surface of the groove; and
forming upper conductive lines on the insulator to be in contact with the underlying lower conductive lines.

51. (Previously presented) The method of claim 50, wherein the upper conductive lines extend up and around said upper portion of said cylindrical insulator to form a rounded upper conductive line.

52. (Cancelled)